**PART NUMBER:**
**CPLOWAMB001A00**
**CPLOWAMB002A00**

**SMALL PACKAGED PRODUCTS**

**1–1/2 to 5 TONS (50/60 Hz)**

**MOTORMASTER II HEAD PRESSURE CONTROLLER**

# Installation Instructions

**NOTE**: Read the entire instruction manual before starting the installation.

## SAFETY CONSIDERATIONS

Installation and servicing of this equipment can be hazardous due to mechanical and electrical components. Only trained and qualified personnel should install, repair, or service this equipment.

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on this equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the unit and other safety precautions that may apply.

Follow all safety codes. Installation must be in compliance with local and national building codes. Wear safety glasses, protective clothing, and work gloves. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words; DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

Follow all safety codes. Wear safety glasses and work gloves. Have a fire extinguisher available.

### ⚠ WARNING

**ELECTRICAL SHOCK HAZARD**
Failure to follow this warning could cause personal injury or death.
Before performing service or maintenance operations on unit, turn off main power switch to unit and install lockout tag. Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate.

## INTRODUCTION

These instructions cover the installation of the Motormaster II Controller head pressure control device. Refer to the Installation section for directions. Louvered panels are required for this installation; see Item 9 in the Installation section of this document and Tables 1 and 2 for more information.

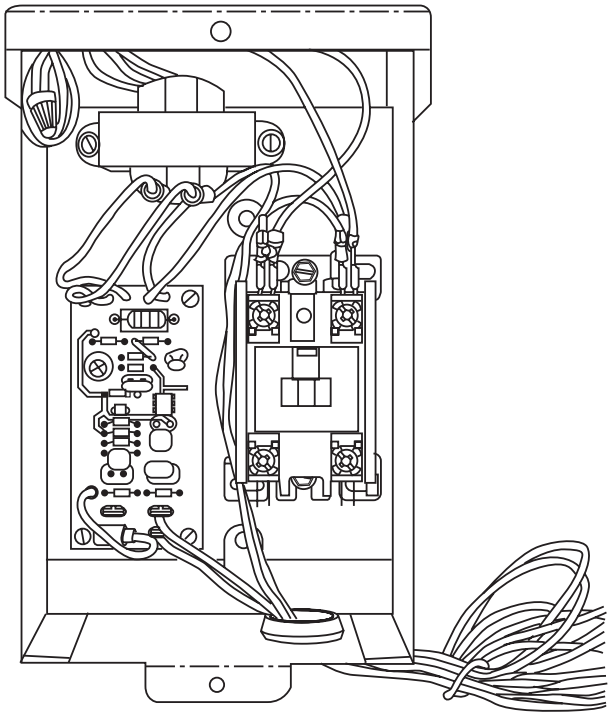
**Table 1 – Add Louvered Panels to These Units**

| | | |
|---|---|---|
| 48ES | 574D | |
| 48GS | 582A | PY1P–B |
| 48GX | 583A | PY2P–B |
| 48SD | 574A | |
| 48SZ | 674A | |
| 50ES | 704D | |
| 50GS | 701A | PA1P–B |
| 50GX | 702A | PA2P–B |
| 50JS | 601A | PH1P–B |
| 50JX | 602A | PH2P–B |
| 50SD | 704A | |
| 50SZ | 604A | |

**Table 2 – Do NOT Add Louvered Panels to These Units**

| | | |
|---|---|---|
| 48VL | 577C | |
| 50SX | 557A | |
| 50HX | 657A | |
| 50VL | 707C | |
| 50ZP | 564A | PA1Z |
| 50ZH | 664A | PH1Z |
| 50ZHA | 664B | PH3Z |
| 50ZPA | 564B | PA3Z |
| 50JZ* | 602B* | |
| 48GP* | 583B* | |
| 48CE* | 574C | |
| 48DT* | 677B | |
| 48DU* | 577B | |
| 48JZ* | 583B* | |
| 48XP* | 574B* | |
| 48XZ* | 674B | |
| 50CE* | 704C* | |
| 50CR* | 604C* | |
| 50DT* | 607B* | |
| 50DU* | 707B* | |
| 50GL* | 702B* | |
| 50XP* | 704B* | |
| 50XZ* | 604B* | |

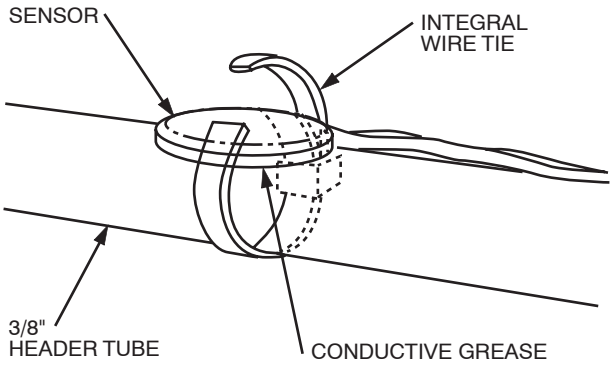
*Louvered panels are standard on these units.



Motormaster® II Controller Interior

C00102

**Fig. 1 - Controller Interior**




**NOTE:** INSTALLED SENSOR MUST BE LEFT UNINSULATED.

**Sensor Connection Details**

C00103

**Fig. 2 - Sensor Connection Details**

## DESCRIPTION AND USAGE

The Motormaster II head pressure controller is a cycle control device activated by a temperature sensor mounted on a header tube of the outdoor coil (see Fig. 1). It is designed to cycle the outdoor-fan motors to maintain the saturated condensing temperature within normal operating limits of approximately 130 to 110°F high (54°C to 43°C), 70 to 50°F low (21 to 10°C). The controller maintains working head pressure at low ambient temperatures down to -20°F (-29°C) when properly installed.

## INSTALLATION

1. Disconnect power to unit. Install lockout tag.
2. Remove unit access panel.
3. Disconnect outdoor-fan motor (OFM). (See Wiring Schematic, Fig. 8 or 9.)
4. Remove OFM wires from unit control box.
5. Mount Motormaster II Controller on unit. Refer to Fig. 3-6. The controller must be mounted vertically with the leads at the bottom. Using the Mounting Template (Fig. 10) as a guide, drill mounting holes. To ensure electrical ground, insert star washers (supplied with the controller) under the heads of mounting screws.

**NOTE**: Field-supplied conduit must be used between controller and access panel (or wire into unit entrance).

6. Determine sensor location by referring to Fig. 11-38. Route sensor wire through bottom of Motormaster II Controller (Fig. 1) to sensor location specified. Prior to installation, apply conductive grease supplied with accessory to contact surface of sensor.

**⚠ CAUTION**

**COMPONENT DAMAGE HAZARD**

Failure to follow this caution may result in component damage.

Sensor assembly is delicate. Handle with care.

7. Attach sensor to top half of header tube as shown in Fig. 2. Installed sensor must be left uninsulated.
8. Power wiring must comply with all local and National Electrical Code (NEC) and International Electric Code (IEC) requirements. Refer to Fig. 8 and 9 for power wiring connections. Coil up all excess wire and secure. (Yellow and blue wires, from controller, must run to unit contactor and connect on the load side.)

**⚠ CAUTION**

**UNIT OPERATION AND COMPONENT DAMAGE HAZARD**

Failure to follow this caution may result in improper unit operation or component damage.

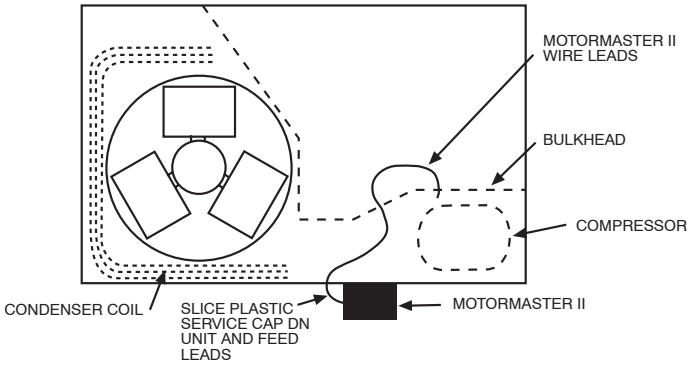
All wires must be secured so that they are not in contact with unit tubing.

9. To prevent wind cross-currents form causing abnormally low condensing temperatures, louvered panels are required on some models. See Table 1 and 2 for models requiring/not requiring louvered panels.
10. Reconnect power to the unit.

The Motormaster II head pressure controller is equipped with an alternate operating mode. When this mode is selected, the controller shifts the fan cycle sequence to effectively raise the average condensing temperature approximately 20°F higher than the standard operating mode. In this alternate mode, the outdoor fan begins cycling at higher outdoor ambient temperatures. This mode should only be used if the evaporator coil shows signs of frosting at low outdoor ambient temperatures.

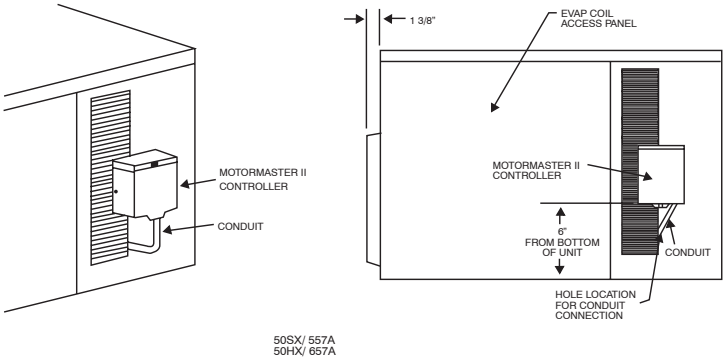
To select the alternate operating mode, move the jumper wire on the Motormaster II control board from reset T1 to T2.

Refer to Fig. 7 for thermistor resistance vs. temperature.



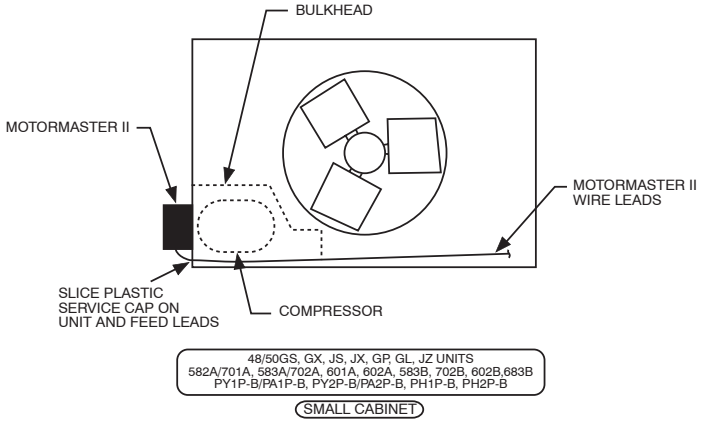

C00108

**Fig. 3 - Mounting Locations**



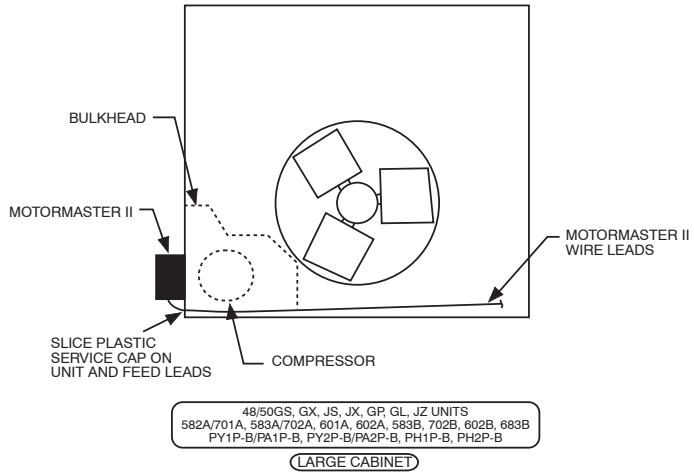

C00141

**Fig. 4 - Mounting Locations**




C00109

**Fig. 5 - Mounting Locations-Small Cabinet**




C00110

**Fig. 6 - Mounting Locations-Large Cabinet**

**Table 3 – Sensor Location Index**

| MODEL NUMBER | FIGURE NUMBER |
|---|---|
| 50JX/602A/PH2P–B 024–048 | Fig. 11 |
| 50JX/602/PH2P–B 060 AND 50JS/601A/PH1P–B 018–030 | Fig. 12 |
| 50JS/601A/PH1P–B 036–060 | Fig. 13 |
| 48GS/582A/PY1P–B/50GS/701A/PA1P–B 018–036 AND 48GX/583A/PY2P–B/50GX/702A/PA2P–B 024–030 | Fig. 14 |
| 48GS/582A/PY1P–B/50GS/701A/PA1P–B 042–060 AND 48GX/583A/PY2P–B/50GX/702A/PA2P–B 036–060 | Fig. 15 |
| 48GP/50GL/583B/702B 024–048 AND 50GL 024–048 | Fig. 16 |
| 48GP/50GL/583B/702B 060 | Fig. 17 |
| 48/50JZ/683B/602B 024–060 | Fig. 18 |
| 50ZP/564A/PA1Z 024–042 | Fig. 19 |
| 50ZP/564A/PA1Z 048–060 | Fig. 20 |
| 50ZH/664A/PH1Z 024–042 | Fig. 21 |
| 50ZH/664A/PH1Z 048–060 | Fig. 22 |
| 50SZ/557A 024–060 | Fig. 23 |
| 50HX/657A 048–060 | Fig. 24 |
| 50HX/657A 024–042 | Fig. 25 |
| 48ES/50ES/574D/704D 018–060 | Fig. 26 |
| 48XP/50XP/48CE/50CE/577B/574C/704B/704C 024–060 | Fig. 27 |
| 48DT/50DT/607B/677B 024–042 | Fig. 28 |
| 48DU/50DU/48BL/50VL/577B/707B/577C/707C 042–060 | Fig. 29 |
| 48SD/50SD/574A/704A/PY3P/PA3P 024–060 Series 301 AND A | Fig. 30 |
| 48SD/50SD/574A/704A/PA3P/PY3P 024–042 Series 311 AND B | Fig. 31 |
| 48DT/50DT/677B/607B 048–060 | Fig. 32 |
| 48DU/50DU/577B/707B 024–036 AND 48VL/50VL/577C/707C 036–042 | Fig. 33 |
| 48SZ/50SZ/674A/604A 024–060 | Fig. 34 |
| 48VL/50VL/577C/707C 018–030 AND 060 | Fig. 35 |
| 48XZ/50XZ/50CR/674B/604B 024–060 AND 604C 030–060 | Fig. 36 |
| 50ZHA/50ZPA/564B/664B/PA3Z/PH3Z 024–042 | Fig. 37 |
| 50ZHA/50ZPA/564B/664B/PA3Z 048–060 AND PH3Z048 AND PH3P 060 | Fig. 38 |



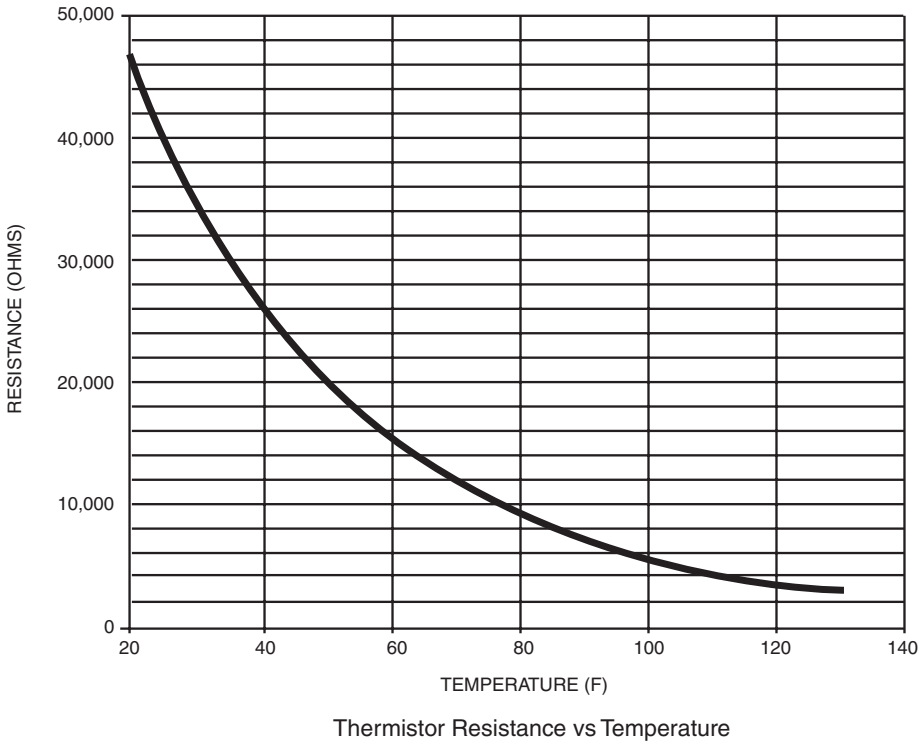
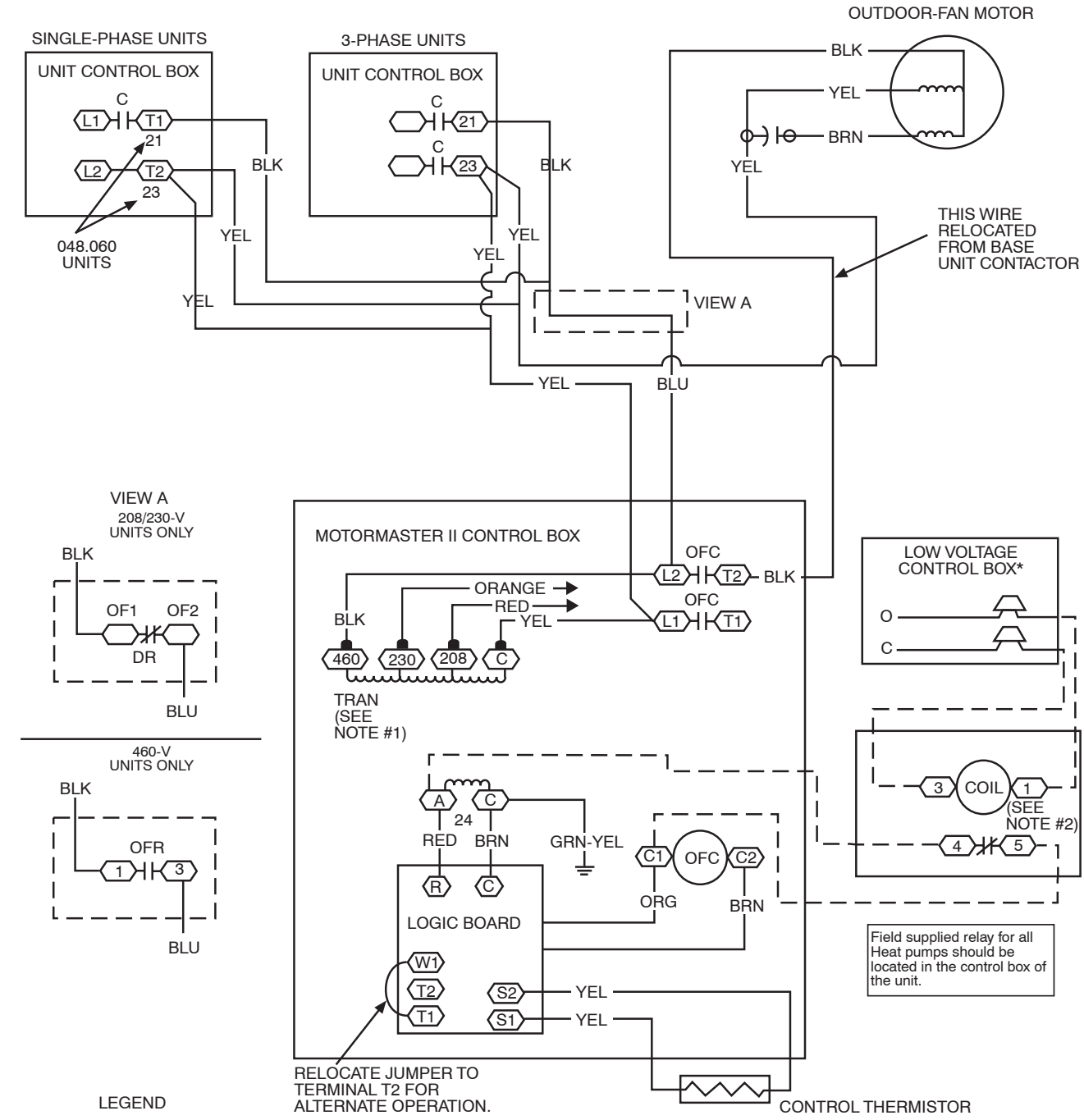



**Fig. 7 - Thermistor Resistance vs. Temperature Chart**




LEGEND

| | | |
|---|---|---|
| C | — | Contactor |
| DR | — | Defrost Relay |
| OFC | — | Outdoor-Fan Contactor |
| OFR | — | Outdoor-Fan Relay |
| TRAN | — | Transformer |
| | — | Field Wiring |

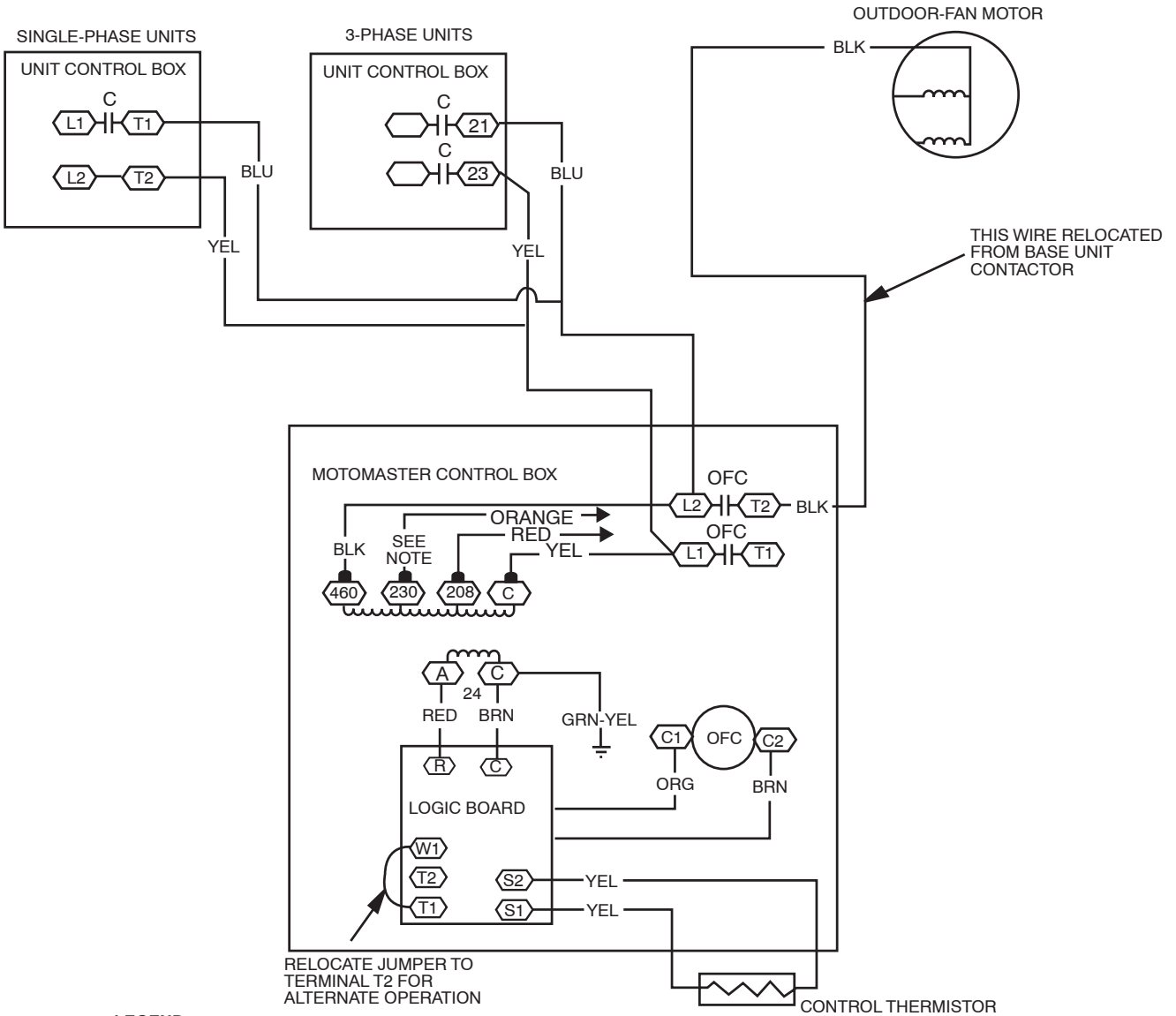
*In low voltage control box, “O” is orange and “C” is Brown (common).

NOTES:

1. Motomaster® II transformer is wired for 460-v supply; it must be rewired for 208/230-v application. Be sure to insulate unused tap.
2. Relay, part no. HN61KB324, is field supplied and normally closed.
3. CPLOWAMB002A00 transformer only contains a 400-v. supply.

C00106

**Fig. 8 - Wiring Schematic Heat Pumps**




**LEGEND**

**C** - Contractor
**OFC** - Outdoor- Fan Contactor
**TRAN** - Transformer

NOTE:
1. Motormaster® II is wired for 460-v supply; it must be rewired for 208/230-v application. Be sure to insulate unused tap.
2. CPLOWAMB002A00 Transformer only contains a 400V supply.

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**Fig. 9 - Wiring Schematic, AC and Gas PACs**

MOUNTING TEMPLATE

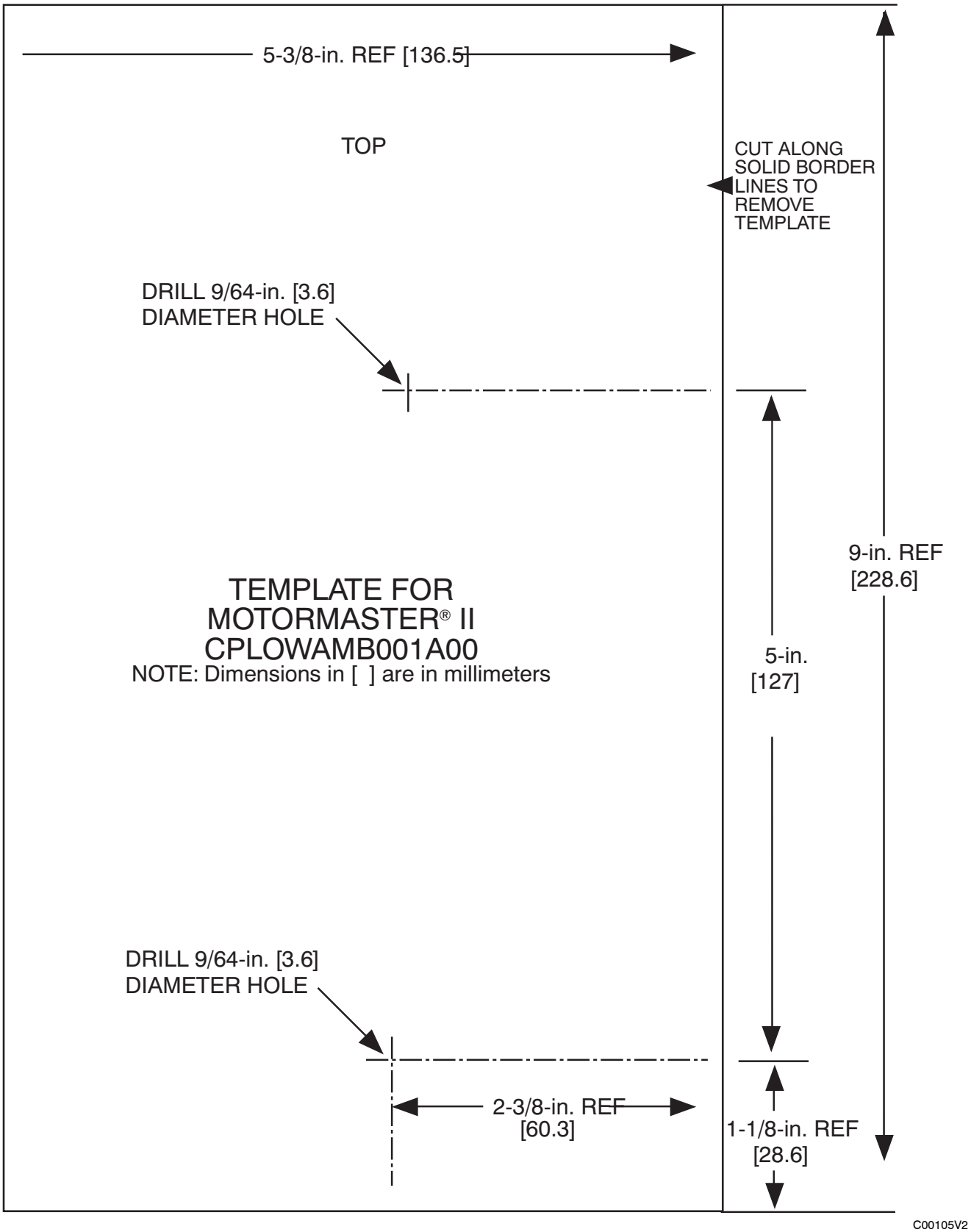


**Fig. 10 – Controller Mounting Template**

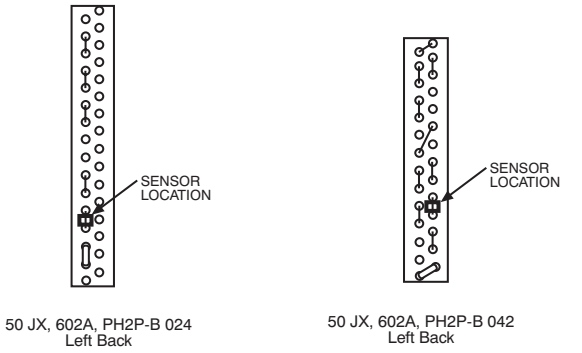


**Fig. 11 - Sensor Mounting Location**

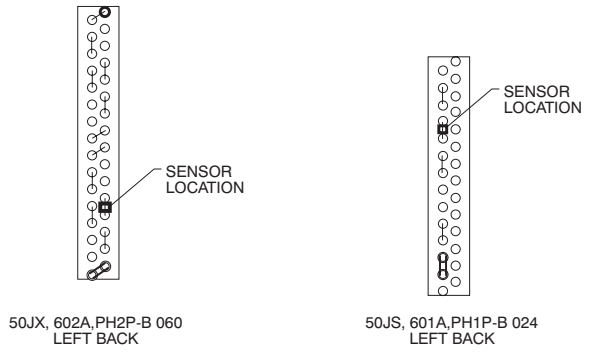


**Fig. 12 - Sensor Mounting Location**

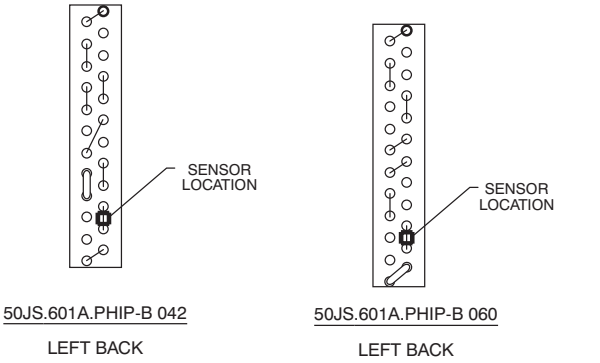


**Fig. 13 - Sensor Mounting Location**

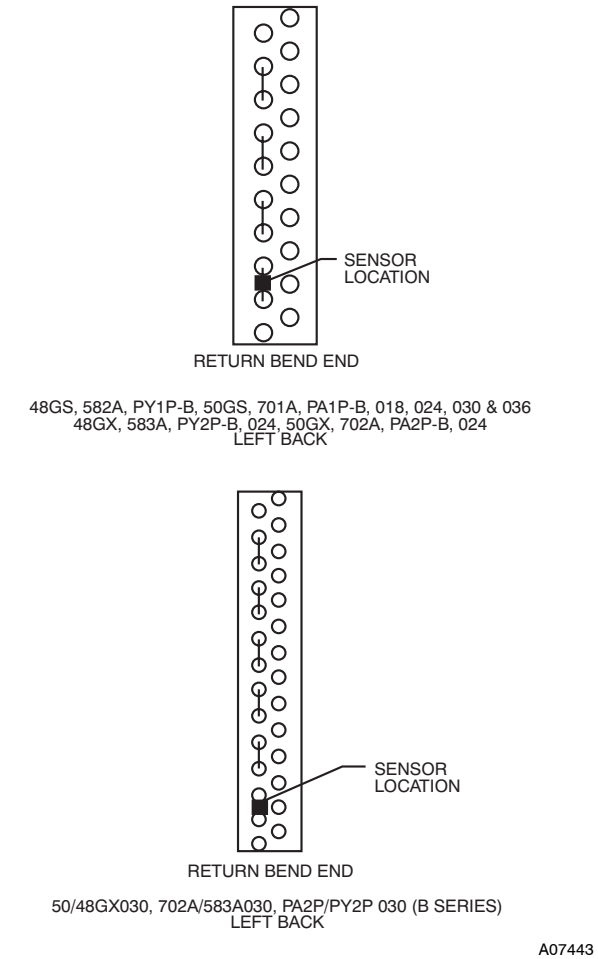
SENSOR LOCATION
RETURN BEND END
48GS, 582A, PY1P-B, 50GS, 701A, PA1P-B, 018, 024, 030 & 036
48GX, 583A, PY2P-B, 024, 50GX, 702A, PA2P-B, 024
LEFT BACK
SENSOR LOCATION
RETURN BEND END
50/48GX030, 702A/583A030, PA2P/PY2P 030 (B SERIES)
LEFT BACK
A07443

**Fig. 14 - Sensor Mounting Location**

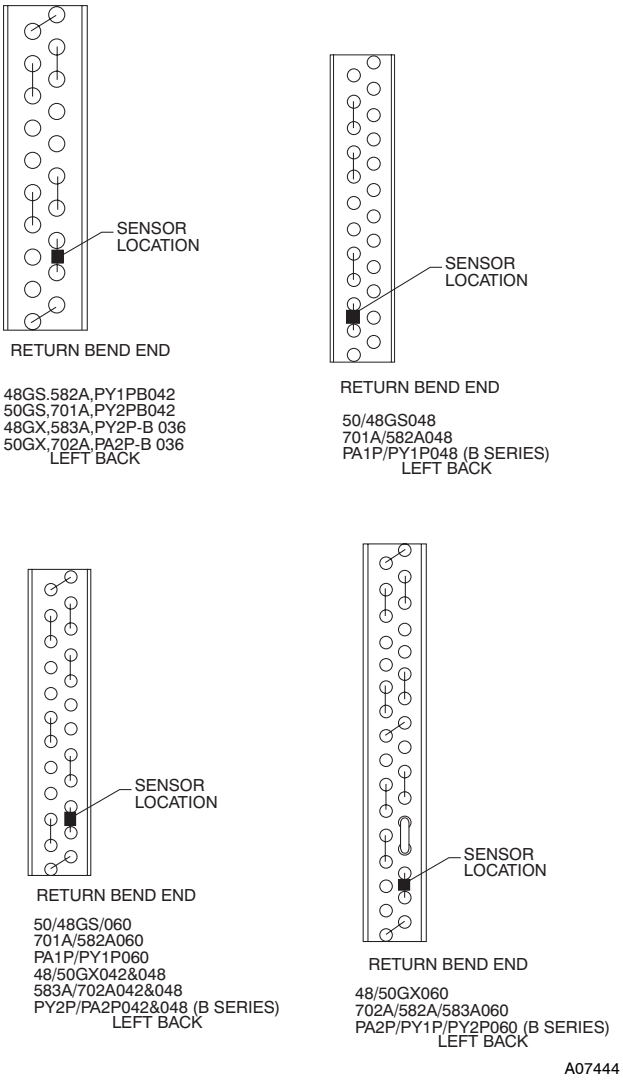


**Fig. 15 - Sensor Mounting Location**

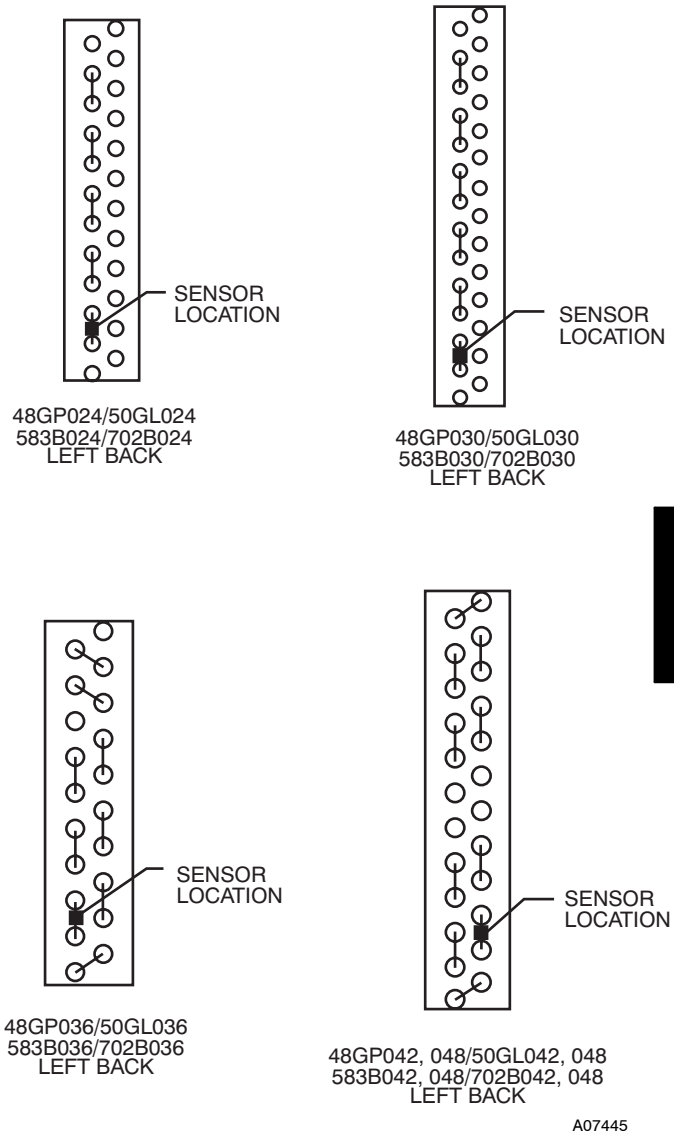


**Fig. 16 - Sensor Mounting Location**

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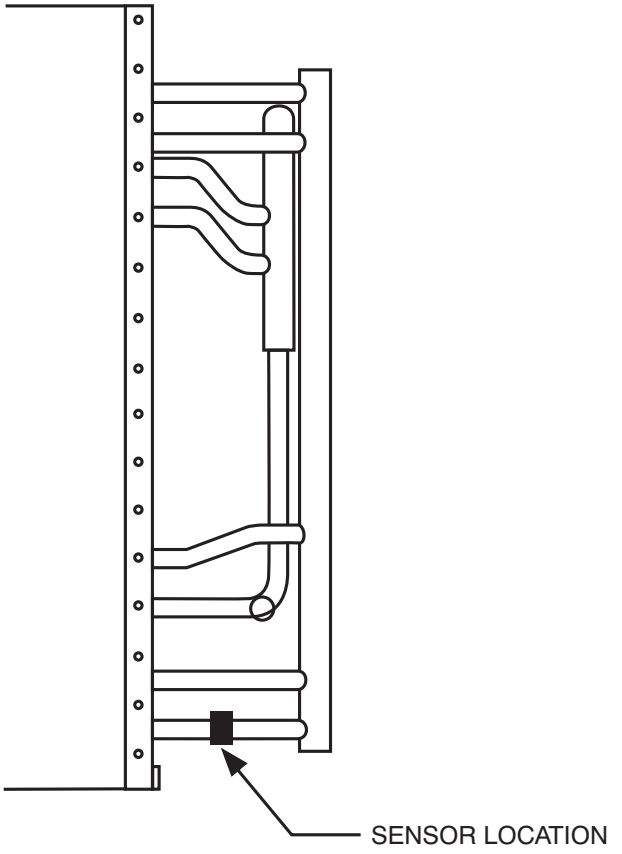


**Fig. 17 - Sensor Mounting Location**

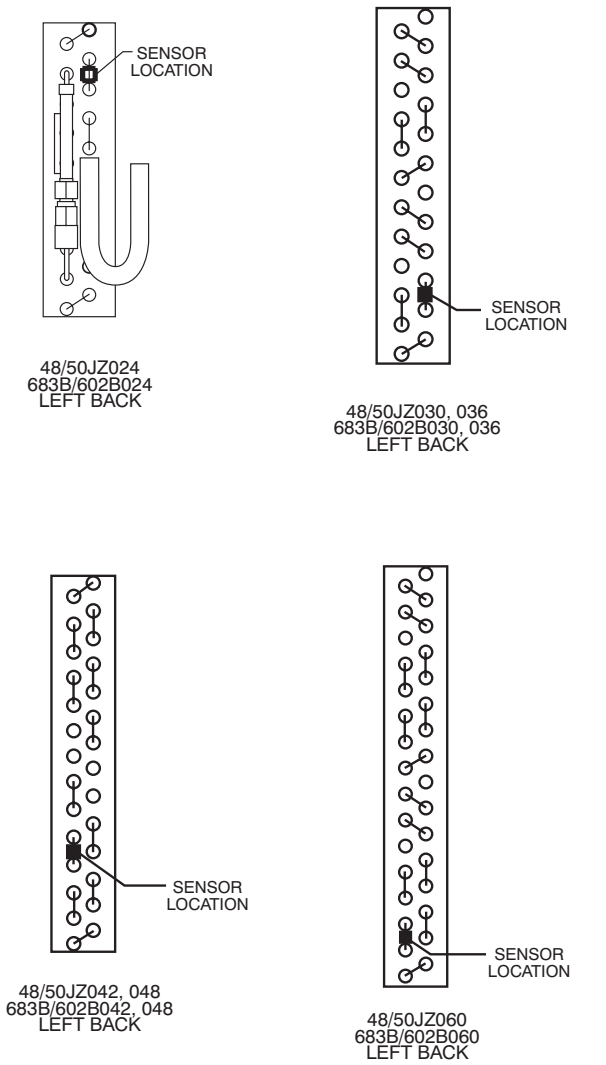


**Fig. 18 - Sensor Mounting Location**

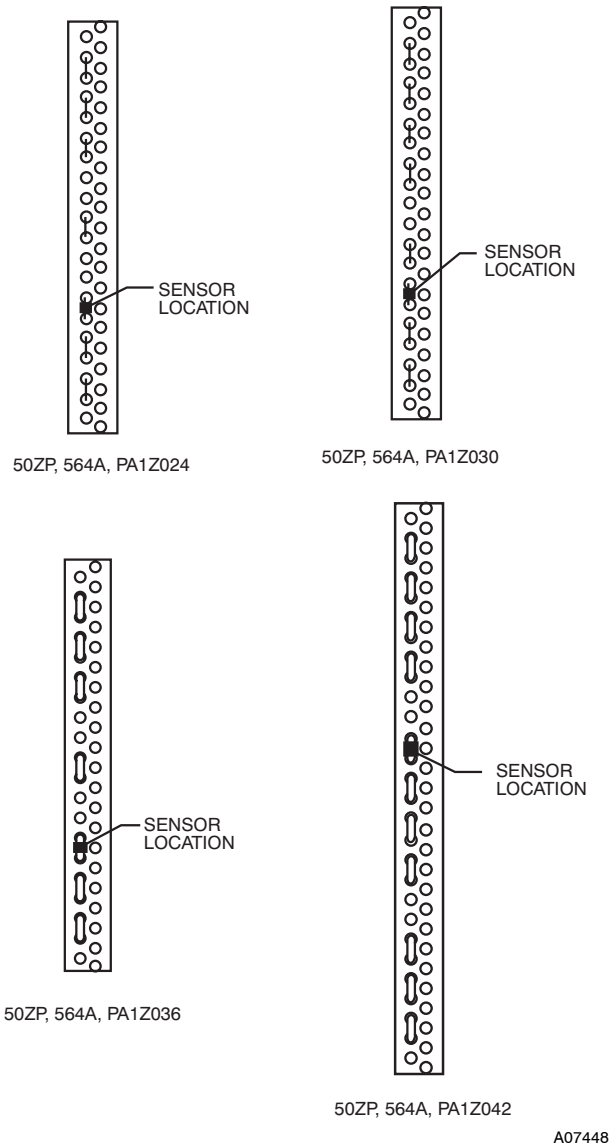


**Fig. 19 – Sensor Mounting Location**

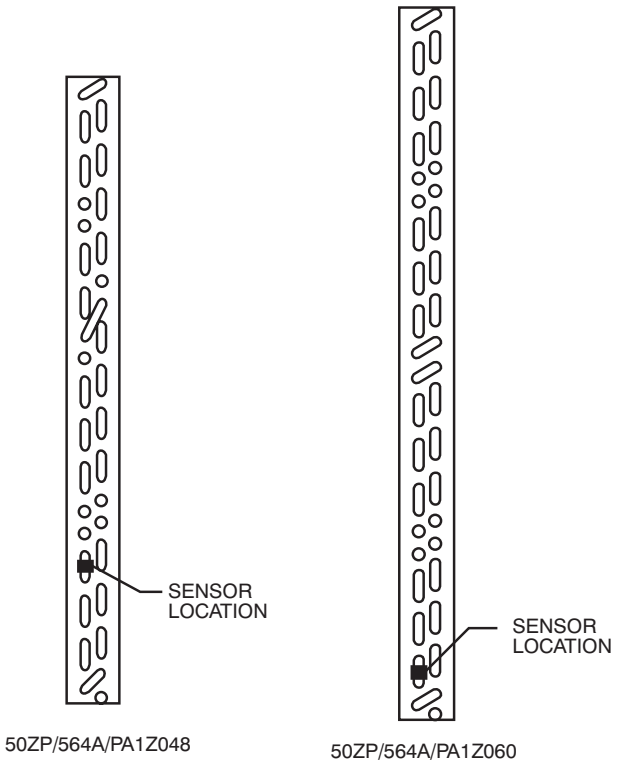


**Fig. 20 – Sensor Mounting Location**

CP LOWAMB

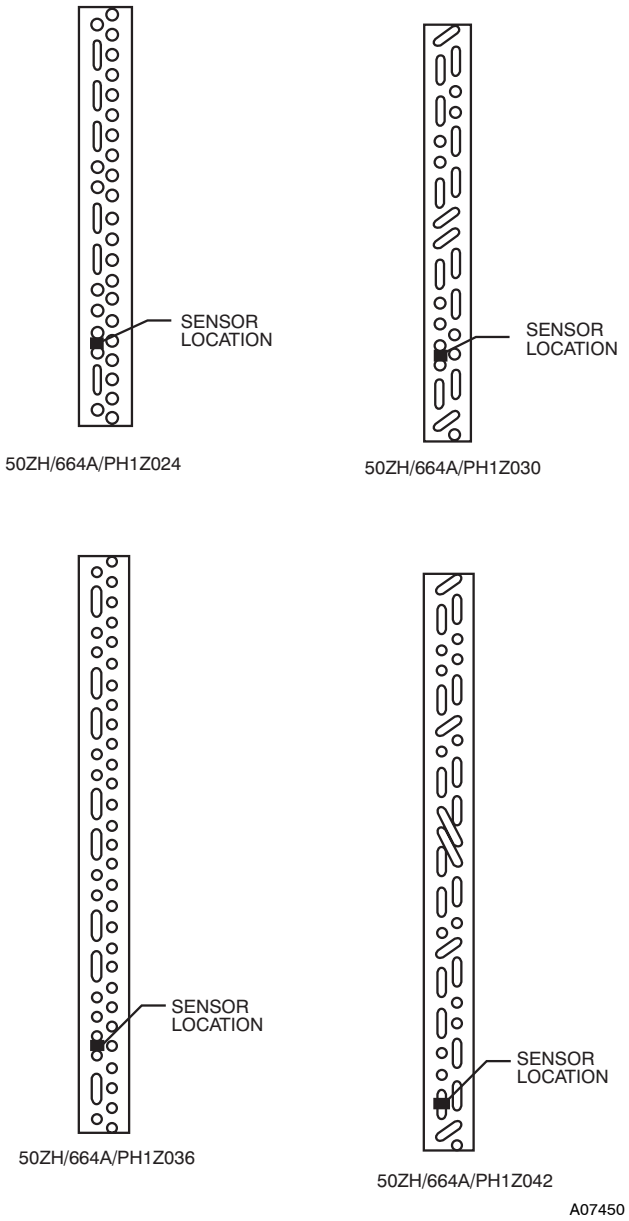


**Fig. 21 - Sensor Mounting Location**

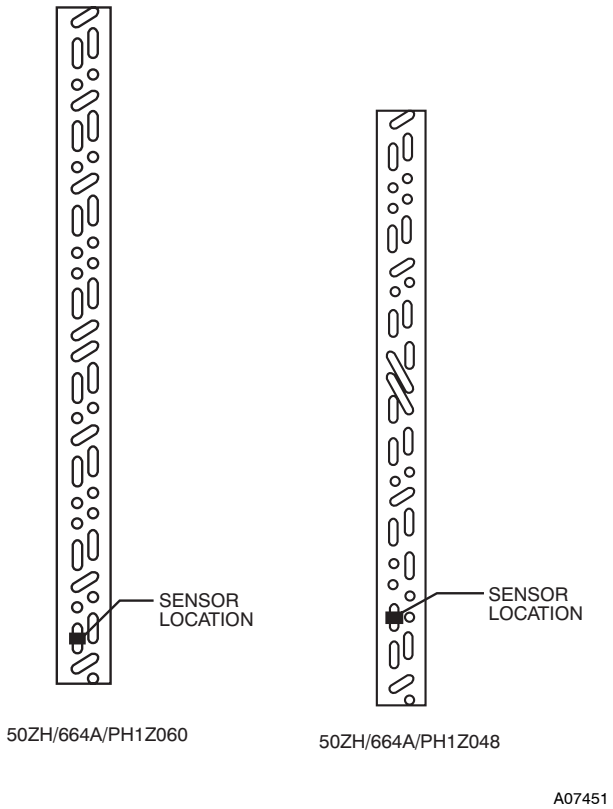


**Fig. 22 - Sensor Mounting Location**

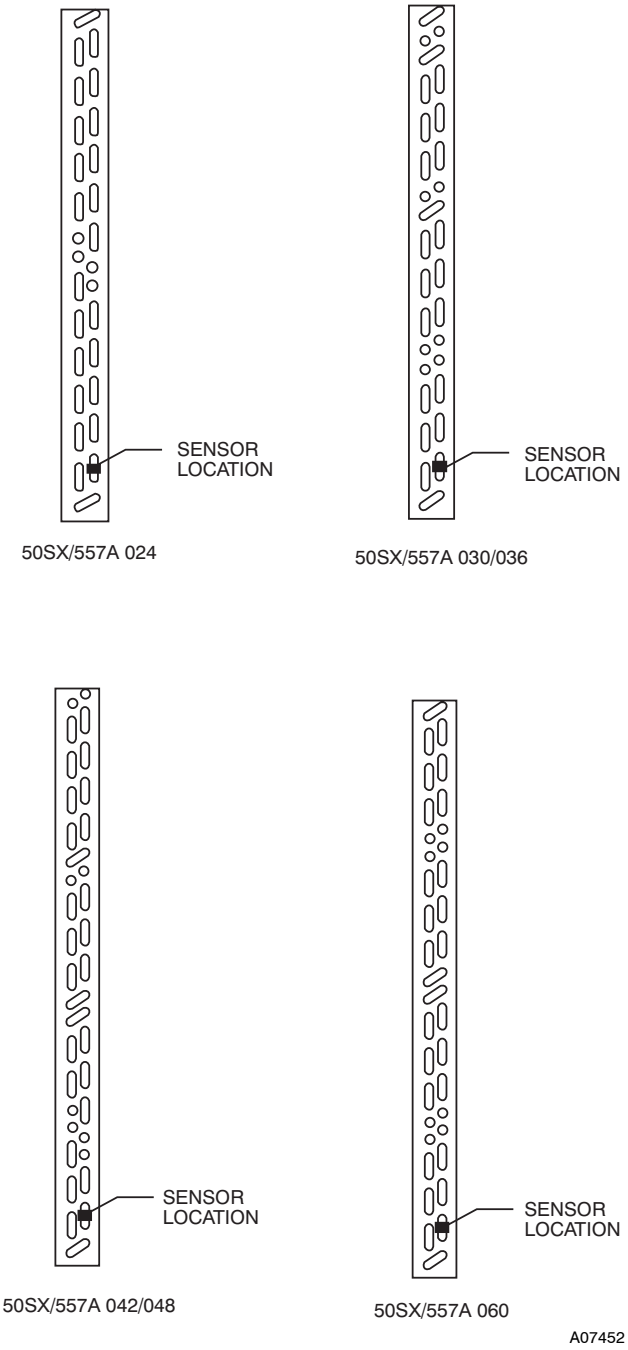


**Fig. 23 - Sensor Mounting Location**

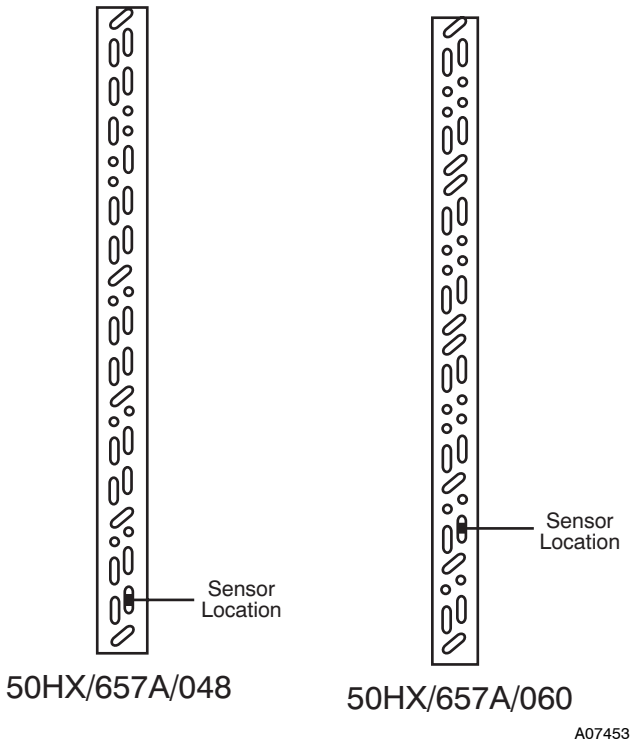


**Fig. 24 - Sensor Mounting Location**

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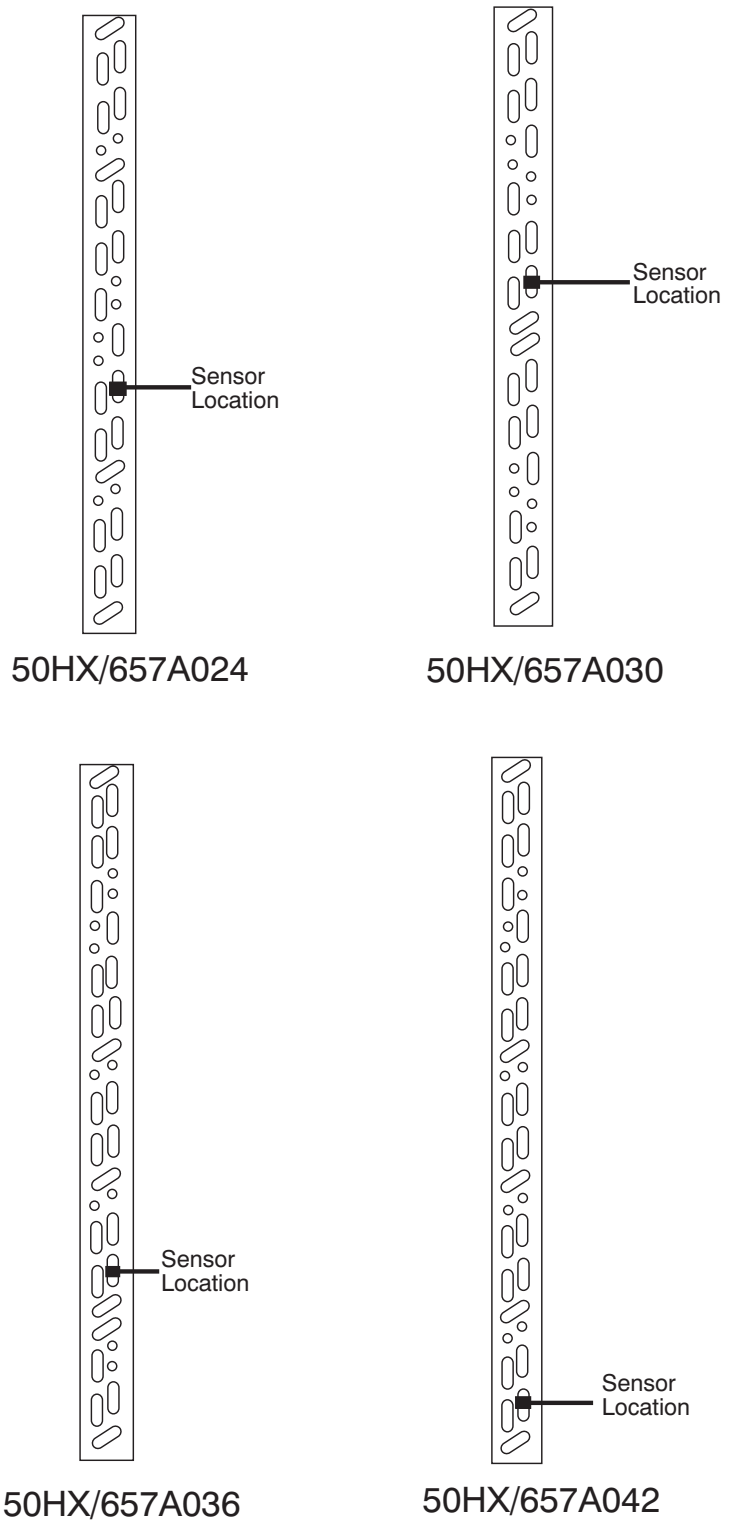
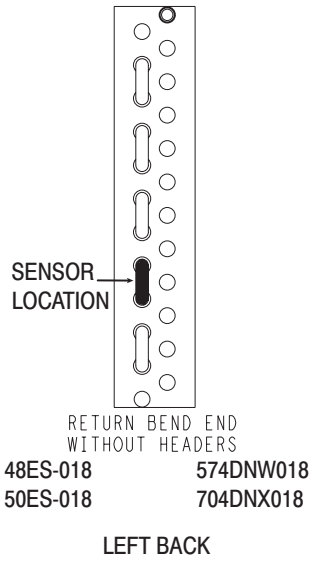
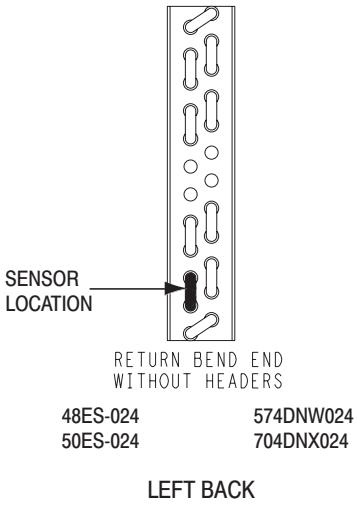
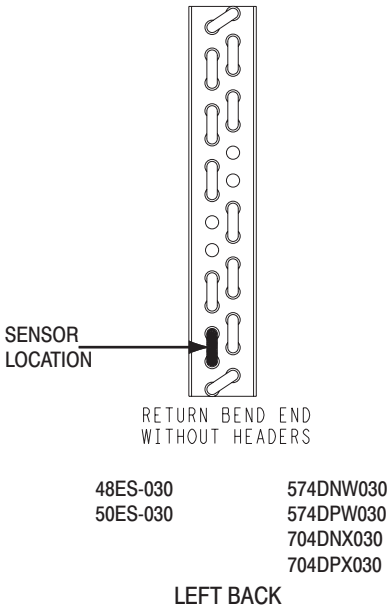
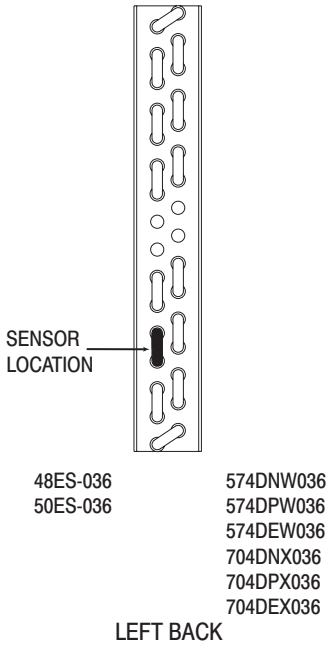


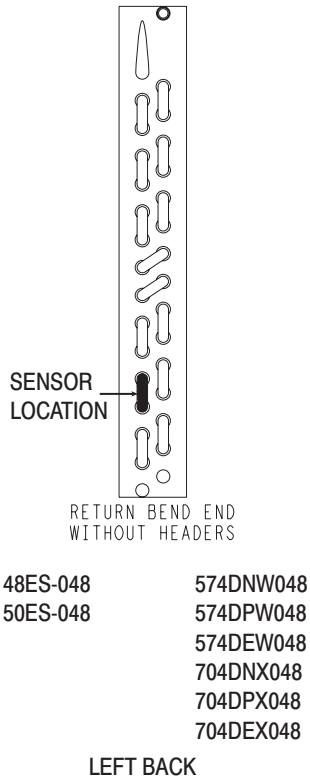

**Fig. 25 - Sensor Mounting Location**



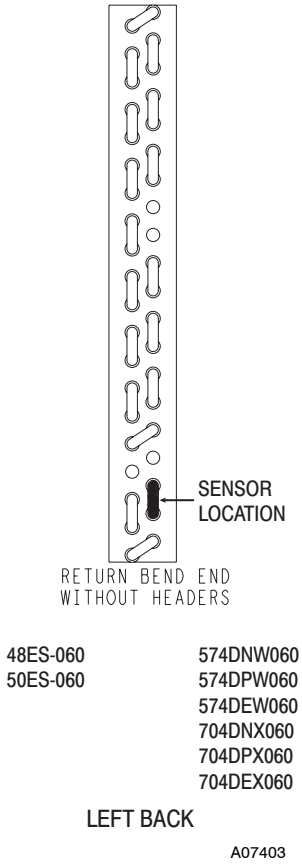




**Fig. 26 – Sensor Mounting Location**

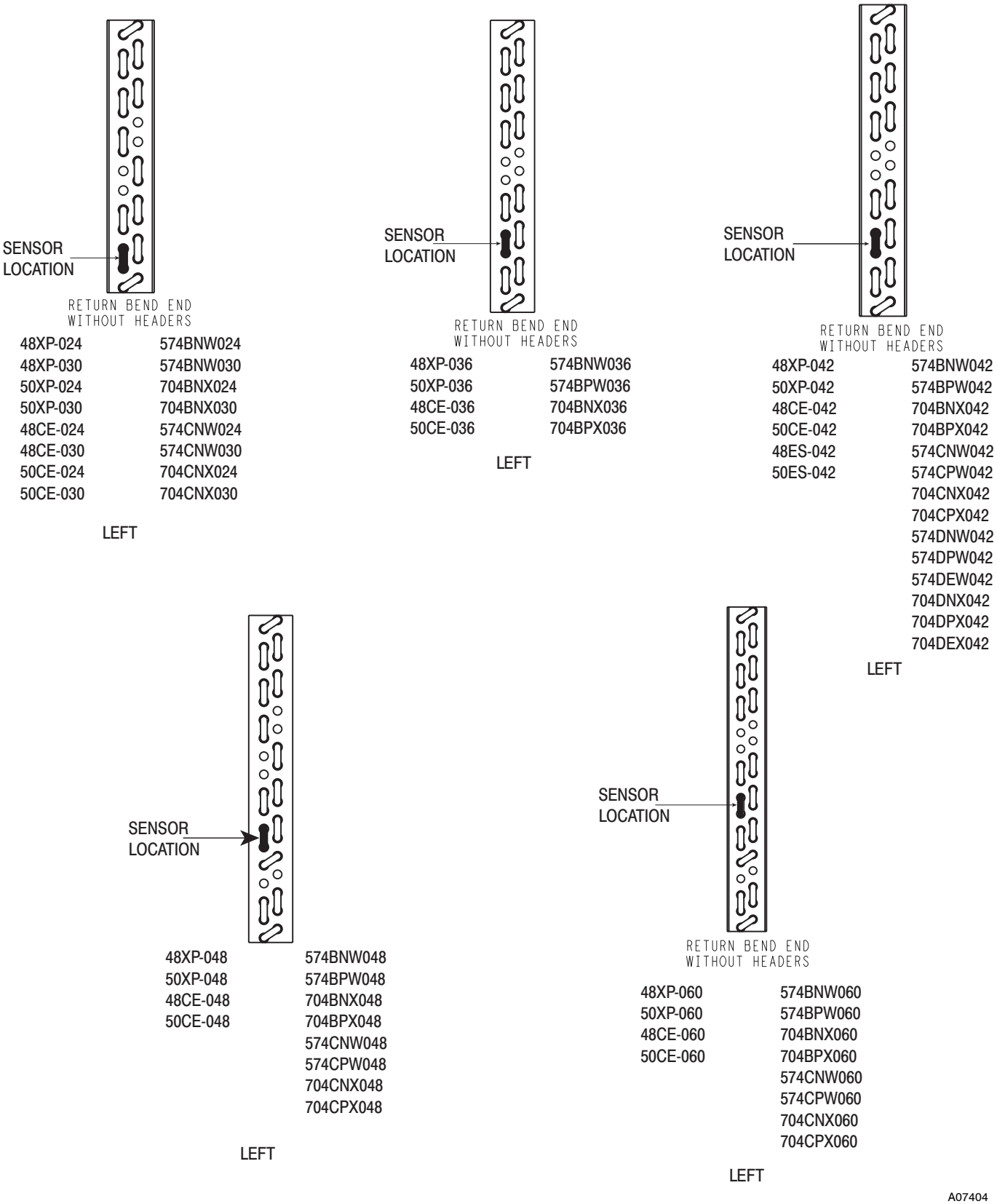



**Fig. 27 – Sensor Mounting Location**

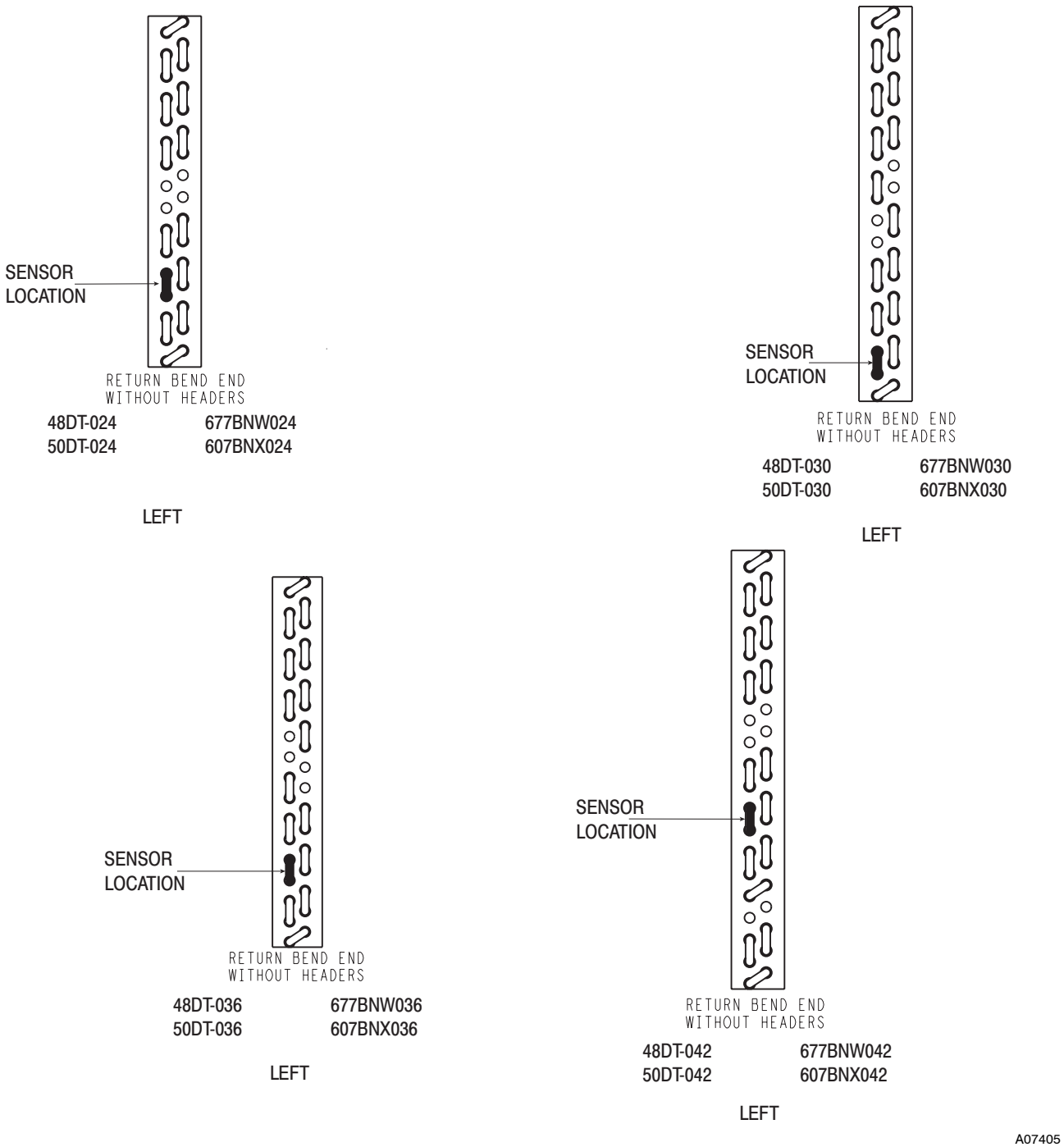



**Fig. 28 – Sensor Mounting Location**

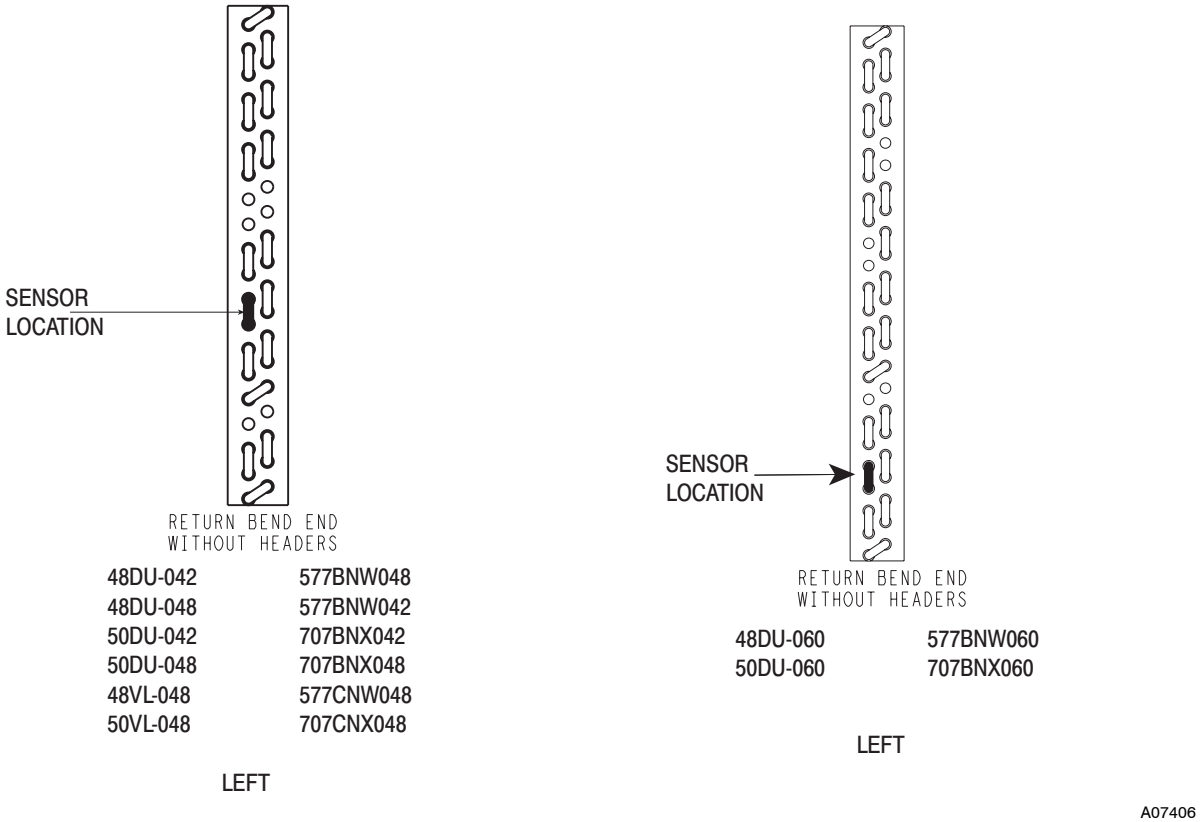
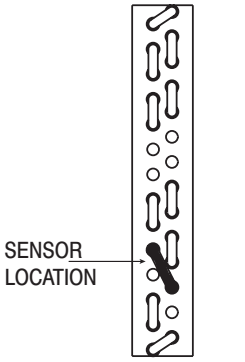


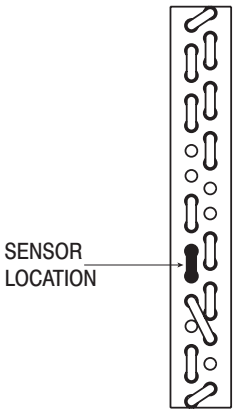

**Fig. 29 – Sensor Mounting Location**




48SD-024 574ANW024
50SD-024 704ANX024
PY3P024 PA3P024

301 and A Series

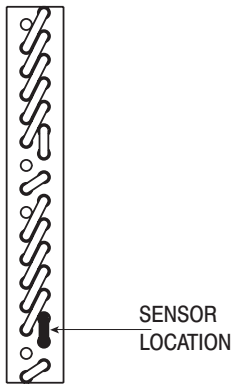
LEFT




48SD-030 574ANW030
50SD-030 574APW030
704ANX030
704APX030
PY3P024
PA3P024

301 and A Series

LEFT

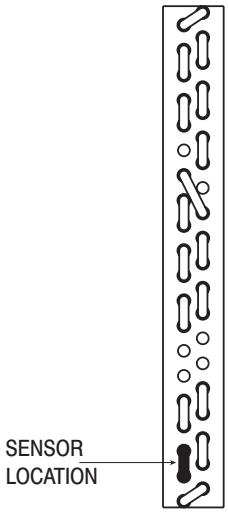



48SD-036 574ANW036
50SD-036 574APW036
574AEW036
704ANX036
704APX036
704AEX036
PY3P036
PA3P036

301 and A Series

LEFT

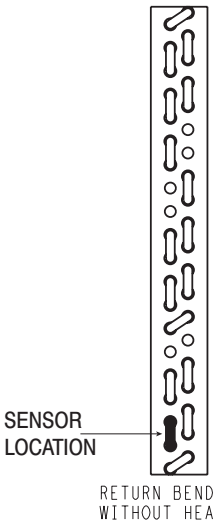
CP.LOWAMB




48SD-042 574ANW042
50SD-042 574APW042
574AEW042
704ANX042
704APX042
704AEX042
PY3P042
PA3P042

301 and A Series

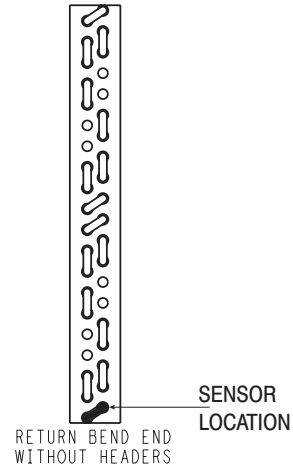
LEFT




48SD-048 574ANW048
50SD-048 574APW048
574AEW048
704ANX048
704APX048
704AEX048
PY3P048
PA3P048

301, 311, A and B Series

LEFT



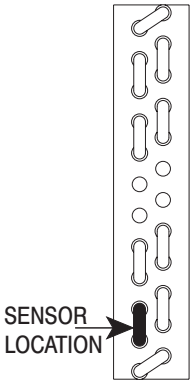

48SD-060 574ANW060
50SD-060 574APW060
574AEW060
704ANX060
704APX060
704AEX060
PY3P060
PA3P060

301, 311, A and B Series

LEFT

A07408

**Fig. 30 – Sensor Mounting Location**

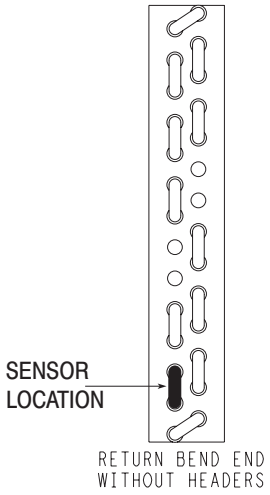



48SD-024
50SD-024

574ANW024
704ANX024
PA3P024
PY3P024

311 and B Series

LEFT

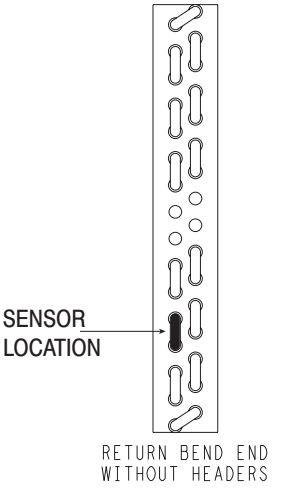



48SD-030
50SD-030

574ANW030
574APW030
704ANX030
704APX030
PY3P030
PA3P030

311 and B Series

LEFT

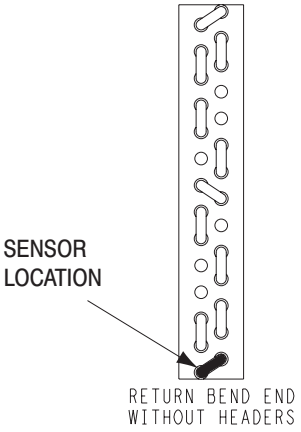



48SD-036
50SD-036

574ANW036
574APW036
574AEW036
704ANX036
704APX036
704AEX036
PY3P036
PA3P036

311 and B Series

LEFT




48SD-042
50SD-042

574ANW042
574APW042
574AEW042
704ANX042
704APX042
704AEX042
PY3P042
PA3P-042

311 and B Series

LEFT

A07415

**Fig. 31 – Sensor Mounting Location**

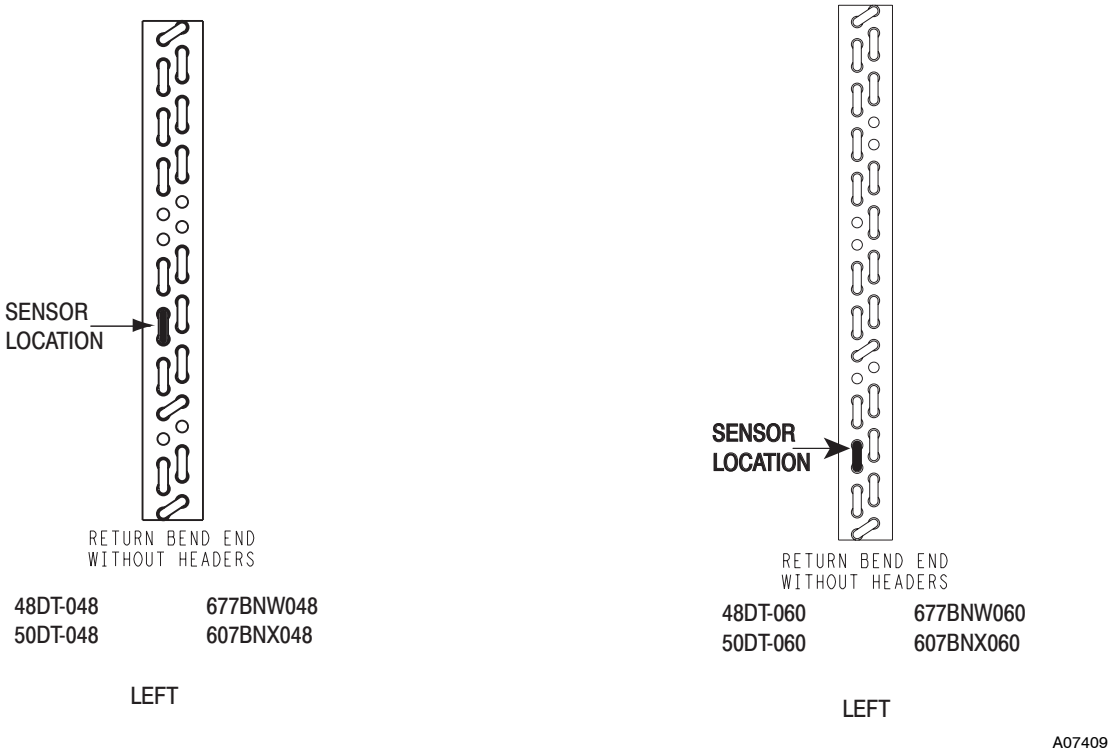



**Fig. 32 - Sensor Mounting Location**

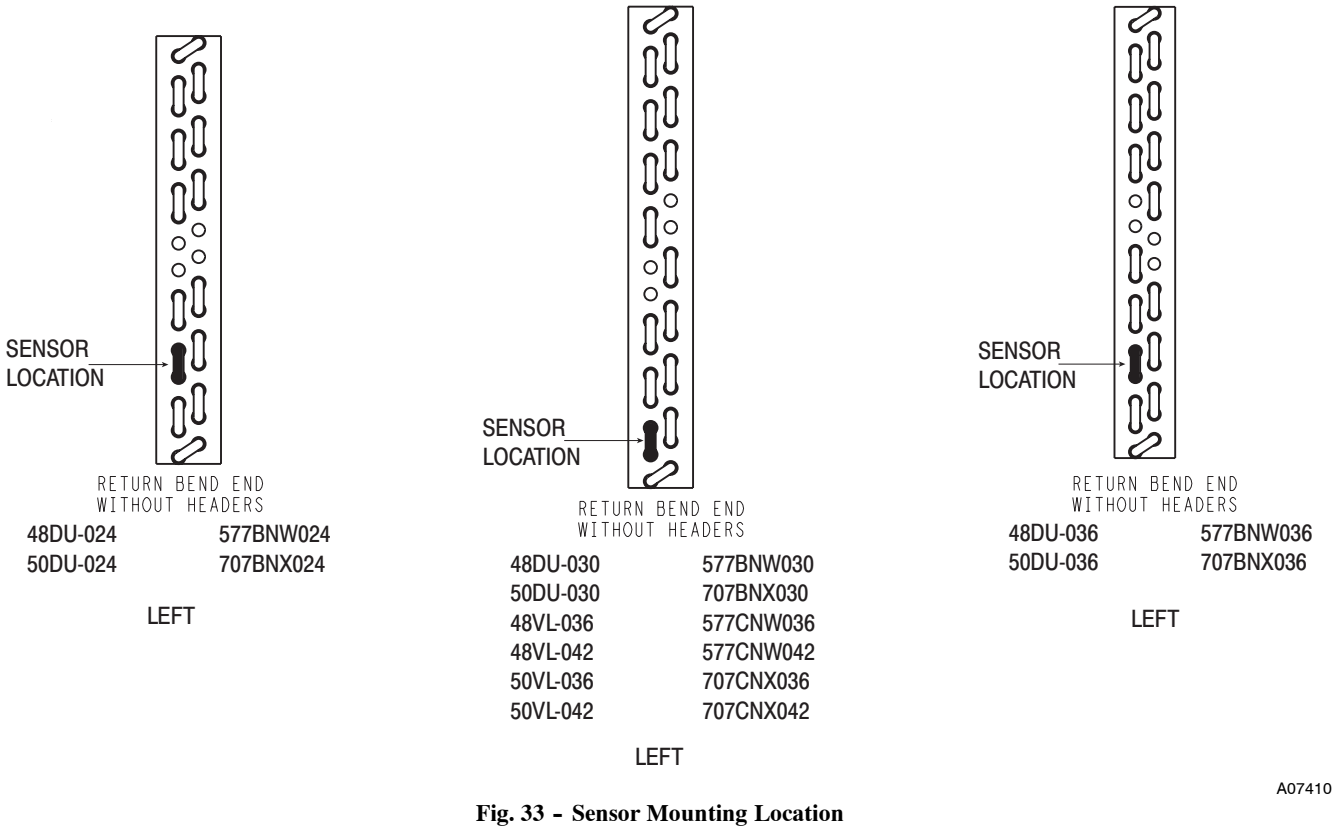



**Fig. 33 - Sensor Mounting Location**

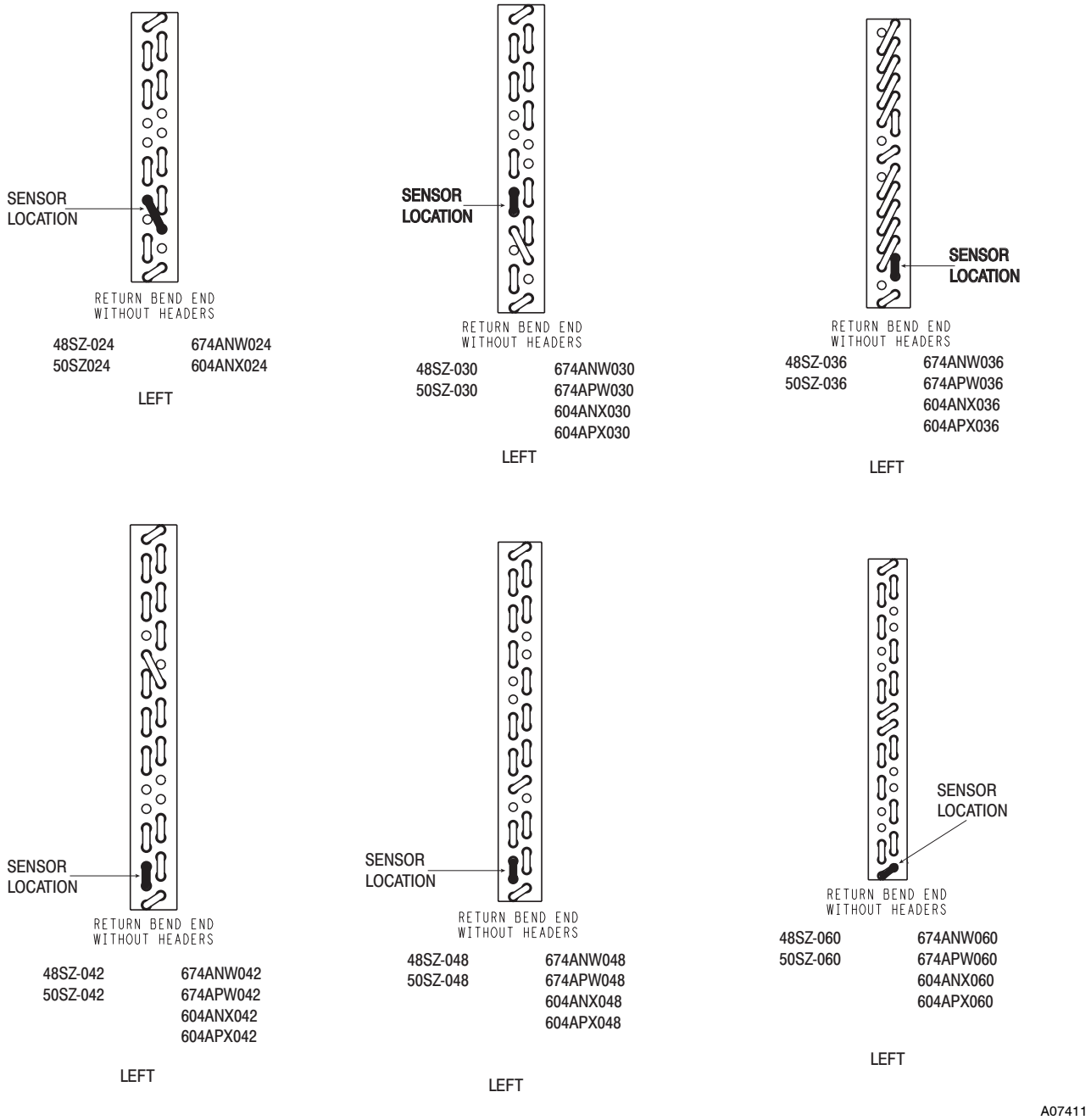



**Fig. 34 – Sensor Mounting Location**

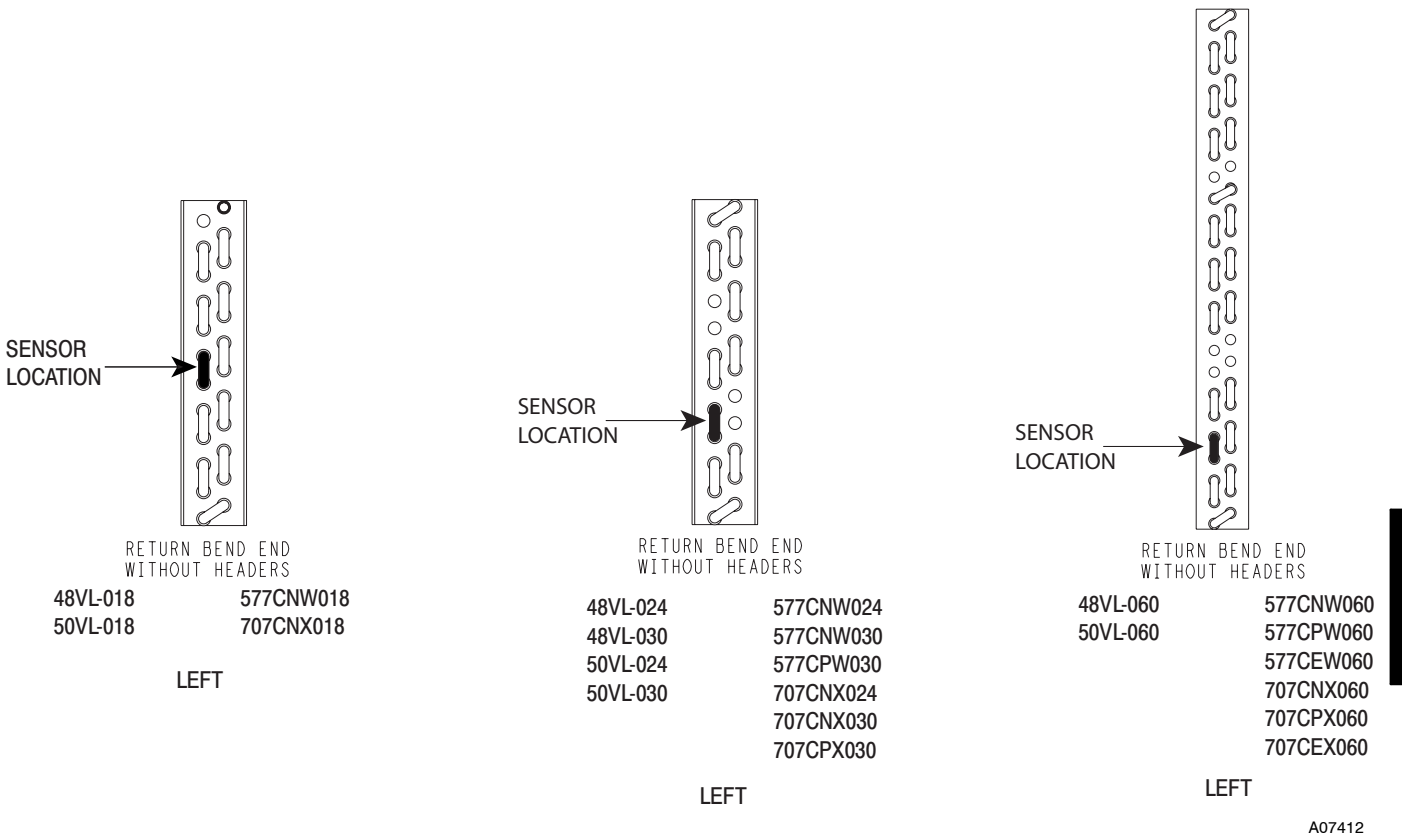



**Fig. 35 - Sensor Mounting Location**

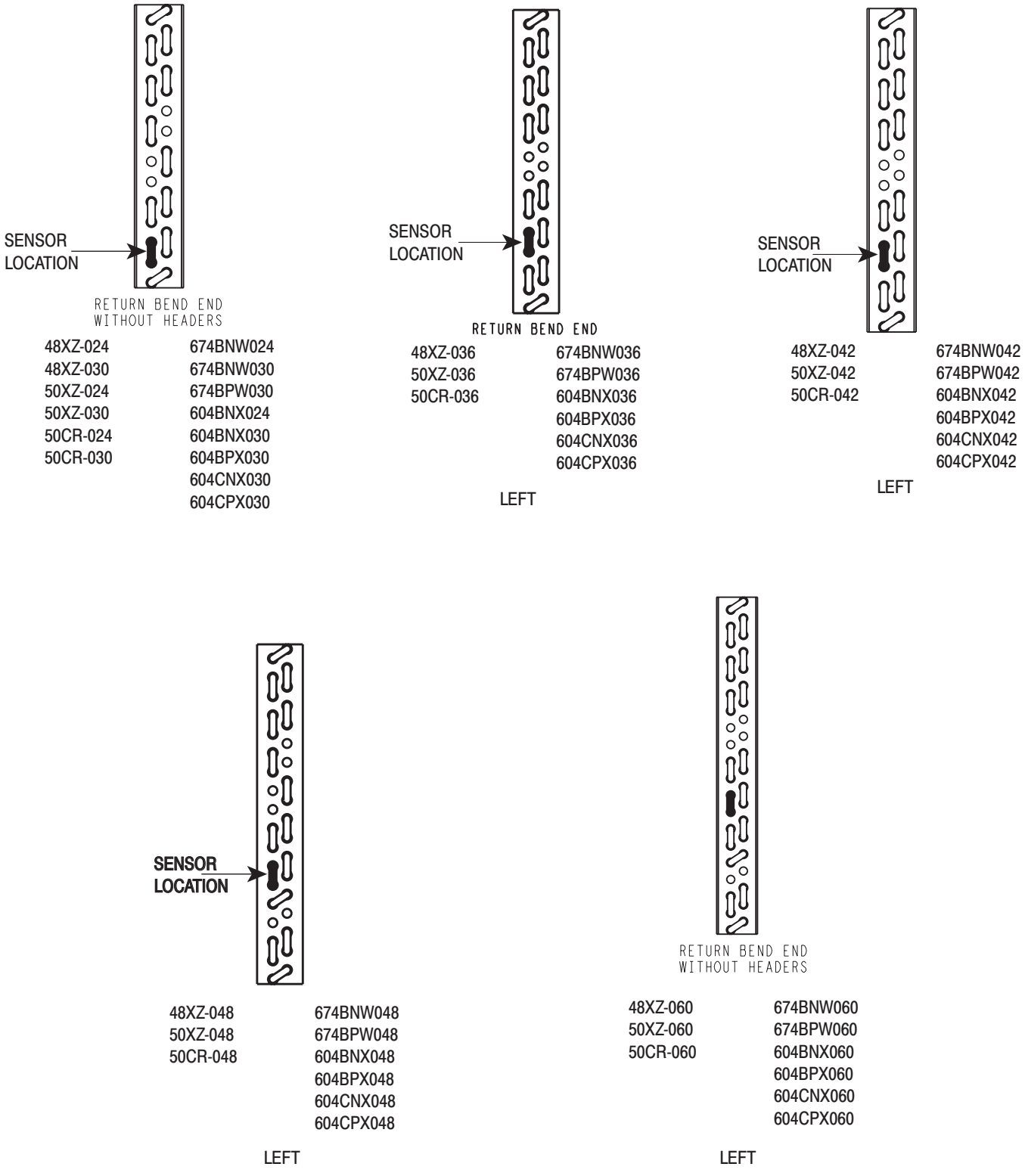



**Fig. 36 – Sensor Mounting Location**

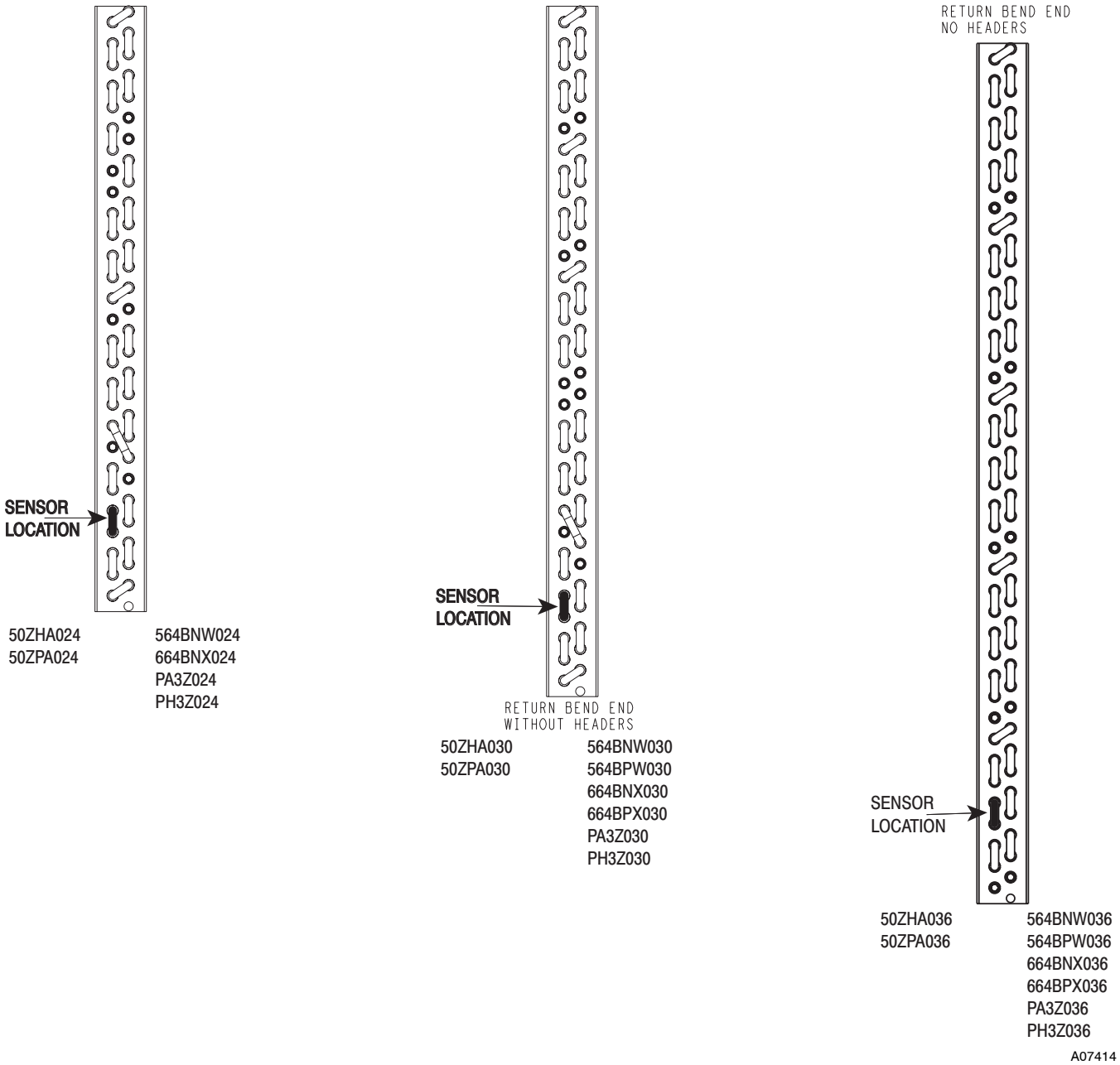



**Fig. 37 – Sensor Mounting Location**

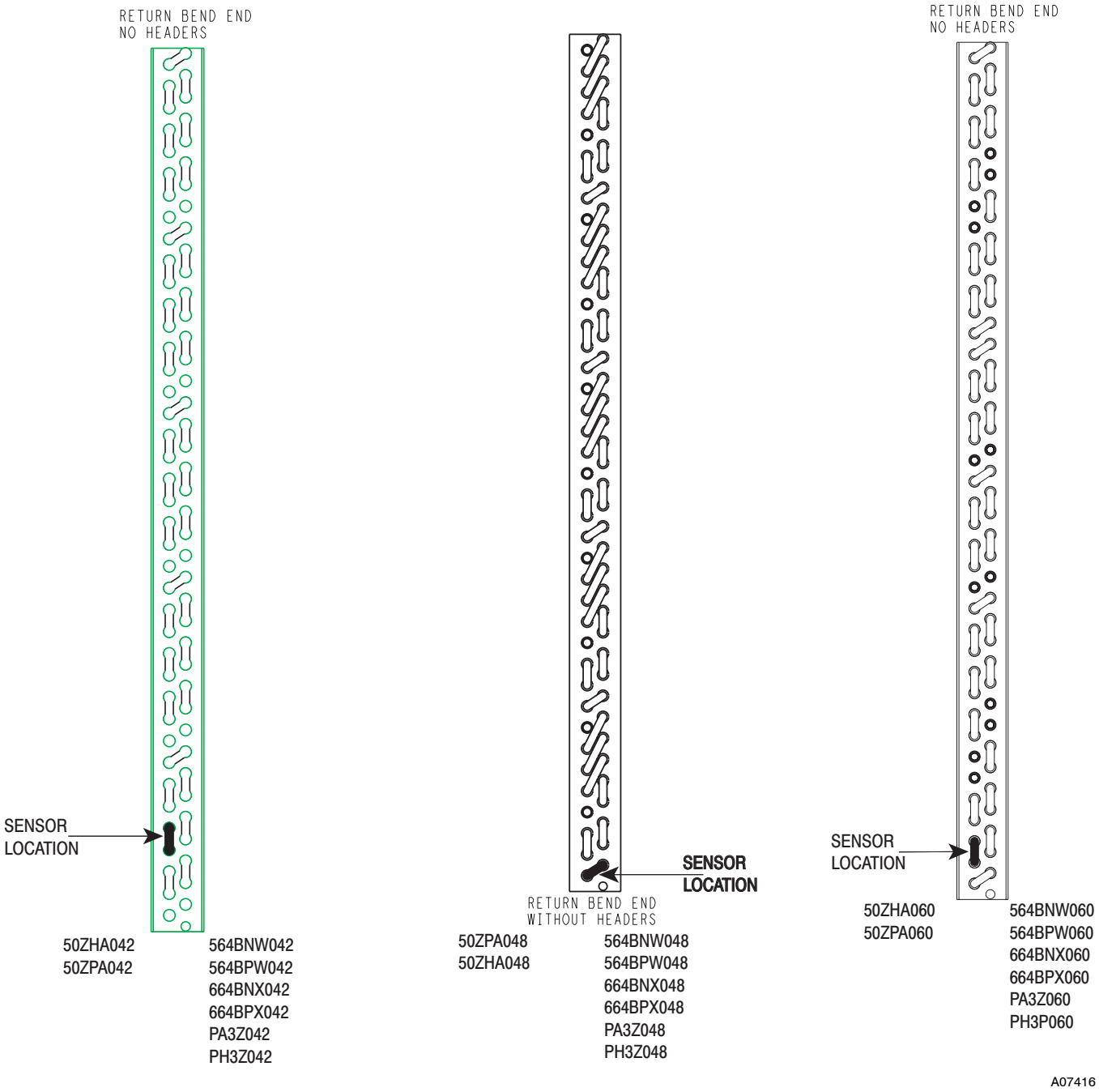



**Fig. 38 – Sensor Mounting Location**

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